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LINKING PREDICTIVE ANALYTICS AND UNDERWRITING AT FREEDOM SPECIALTY INSURANCE COMPANY

A CASE STUDY

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This is an authorized reprint of a Celent case study. The reprint was prepared for SAS Institute, but the analysis has not been changed. For more information about the report, please contact Celent at info@celent.com.

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INTRODUCTION

Many remember the fear associated with the Great Recession as the US economy suffered recurring shocks. In the weeks surrounding the collapse of Lehman Brothers, the entire global financial system seemed threatened. Gross domestic product declined by 3.8% in the last quarter of 2008 — the largest loss in over 25 years. The stock market continued to decline, with the Dow Jones Industrial Average finally settling on March 6, 2009 at a low of 6,443.27 — a loss of over 54% of its value since Q4 2007. General economic conditions were, in a word, terrifying.

Would that have been an opportune time to enter the Director and Officers Liability Insurance (D&O) market? One company made a big bet and is beginning to reap the benefits.

D&O is a specialty insurance product which provides indemnification for legal expenses and liability judgments when a policyholder is sued for negligent, reckless, or bad faith actions or omissions in the course of performing their duties. In determining the pricing, limits, and availability of this coverage, an underwriter considers multiple aspects involving the specific individual, their company, and the likelihood of legal actions (lawsuits).

A review of the D&O market from various industry sources in 2008 yielded a consistent and negative picture.

- Premium decreases averaging 10% over the prior four years, and the expectation that the soft market would continue.
- A surge in securities class-action lawsuits in 2007 and 2008.
- An expected increase in both frequency and severity of claims as the result of the subprime mortgage/credit crisis; the shadow of Enron, WorldCom, and Cendant still looming large.
- A forecasted downturn in underwriting results.
- A prediction of increased reserve strengthening.

Against this background, Craig Landi, an industry veteran, submitted a business case to the executive management at Scottsdale Insurance Company to enter the D&O market. He detailed several advantages for Scottsdale. The line diversified the product portfolio by adding a long-tail casualty line to the existing specialty property business. Earnings volatility decreased because the liability and property lines would follow different pricing cycles. A dissimilar geographic and distribution approach between the two products provided further diversification.

But the business case did not only ask for capital to fund insurance reserves. The vision also included a key differentiator — a risk selection approach that fed external data to a predictive model in order to compliment underwriting intuition. The fundamental assumption was that class action lawsuit data could predict D&O claims. The plan asked for a multi-million dollar technical investment to build a unique underwriting platform. Scottsdale approved the plan and Freedom Specialty Insurance Company was born.

Six years on, the results of this approach are now being realized. Freedom Specialty has grown to over \$300 million in annual direct written premium. Their loss result outperforms the industry, as does the company's productivity rates (as measured by policies per underwriter). The consistency of the underwriting process ensures a high level of control.

Their model delivers a significant amount of detailed data, which results in a high degree of transparency. Freedom Specialty reports that this has increased the confidence in the new operation that extends from front line personnel to senior management in the parent company, to reinsurers. The approach has proved to be effective in the first five years of Freedom Specialty's operations. Losses have been minimal compared to the industry's 48% loss ratio¹ for calendar year 2012, even as underwriters manage portfolios which are comparable in size to industry averages.

This case study explores how Freedom Specialty built, refined, and sustained its analytic underwriting platform. The goal of the case is to identify lessons that others can use to harvest the benefits of analytics in their underwriting operations.

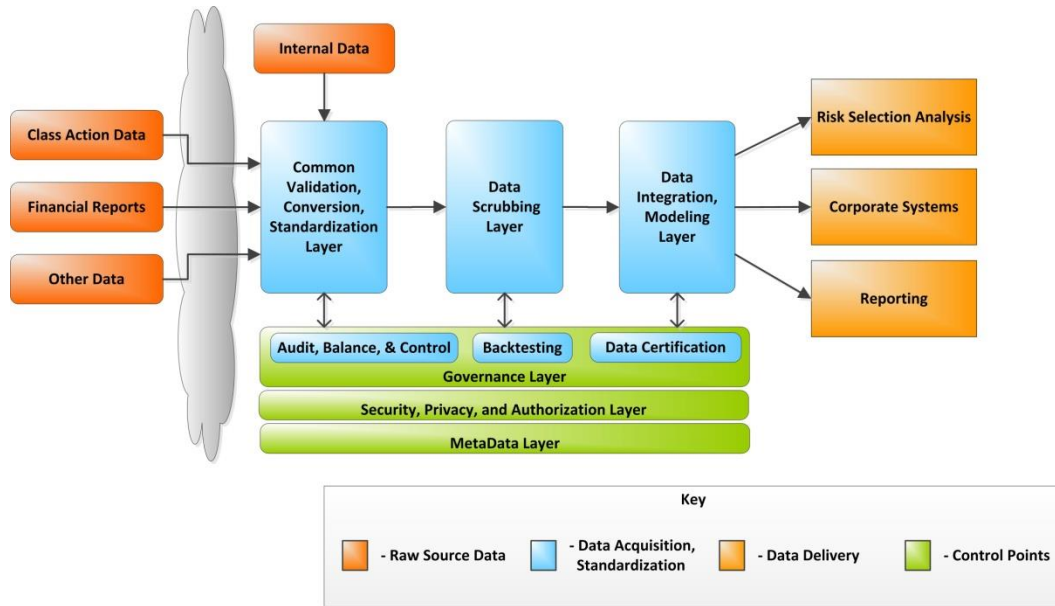
¹Fitch Ratings Directors & Officers Liability Insurance Market Update 2013 Special Report.

THE PLATFORM

TECHNOLOGY

Figure 1 presents a simplified schema of the underwriting platform. Each component is presented at a high level of abstraction; the figure is not intended to be a complete representation of the system.

Figure 1: Representative Schema



Source: Celent

The platform was built through a cooperative effort involving multiple vendors. An actuarial firm developed and tested a predictive model. An external technology supplier constructed the user interface and built the integration with the corporate systems. Technology from SAS Institute was used for multiple components, including several data repositories, statistical analytics engines, and reporting and visualization tools. (Full disclosure: SAS is a Celent research subscription client.)

The key areas of the system are reviewed in this section. This is not a complete feature/function description, but rather presents summary information to illustrate critical learnings gained through implementation and use.

Data sources. The system accesses six distinct external sources and receives data from Scottsdale's administration applications. Some of the external sources, such as class action lawsuit and financial information, are commonly used in the D&O industry; others are unique to Freedom Specialty and drive the predictive model. Because of the critical role data plays in the platform, FS invests significant effort in data quality and data vendor management activities. Its back-testing and categorization processes (explained below), identify weaknesses and inconsistencies in vendor data. The insurer constantly works with vendors to improve the quality and classification of the data. Over time, they have realized that they also have to manage their internal data in the same manner — applying the same quality checks and effort in improving policy and claim data. Finally, maintaining independence is paramount. For example, Freedom Specialty never adopts a vendor's

data identification scheme. This requires some extra maintenance in translating values but ensures that the vendor can be replaced efficiently and rapidly if necessary.

Data scrubbing. Once received, the data goes through multiple cycles designed to improve its usefulness. For example, a monthly categorization of class action data reviews information on over 20,000 individual lawsuits. These are initially categorized according to different dimensions. The categorization on each suit is revisited each month to determine if there have been any changes. This activity initially required weeks of manual work. It has been reduced to days using specialized tools.

A second key process is back-testing. When a claim is reported, the system processes the risk back through the predictive model to test the selection criteria and adjust the predictive tolerances as needed. This positive feedback loop strengthens the model through successive refinement.

Predictive model. Data is combined and fed to a model which uses multivariate analysis to determine optimum ranges of pricing and limits. Algorithms also score the submission across several predetermined dimensions.

Risk selection analysis. This component produces a one-page analysis of recommendations for the underwriter. Comparisons with similar risks are displayed along several risk characteristics such as industry, size, financial structure, etc. A fundamental principle of the platform is that the selection process is driven by underwriter intuition which is aided by technology. The system is not intended to be a replacement for the underwriter.

Interface with corporate systems. Once a decision is reached, selected information is transmitted to administration systems. The policy issuance process is still largely manual and may be considered a future automation enhancement. Once issued, statistical information is passed back into the data source component. As claims occur, loss data is added to the platform.

PEOPLE

The revised underwriting approach required the addition of specialized skills. The team includes legal and statistical resources with experience in building predictive models in the finance industry. These resources tune and improve the data management process and the predictive model performance.

As in many D&O providers, the underwriting group has deep technical insurance knowledge. There has been an adjustment required on the underwriters' part to become comfortable with a system that reduces massive amounts of data to a few pages of analysis. The time traditionally spent by underwriters collecting, collating, and analyzing data is now used in book management and in risk management consulting with brokers and policyholders.

PROCESS

Implementation of the platform has required Freedom Specialty to build new process expertise in several areas.

First, the multiple data management tasks mentioned in the technology section — data scrubbing, categorization, and back-testing — had to be created from scratch. The initial approaches were manual and automating these is a continuous effort. Additionally, the number of information sources continues to expand. For example, an evaluation of the use of cyber security and intellectual property lawsuits is currently underway.

The activities involved in the care, feeding, and management of the predictive model used in other industries have been adapted to the D&O line. Of particular note is that, after the actuarial firm completed the model, it required multiple months to gain a complete understanding of the model's most intricate workings.

Finally, processes were established to ensure the effective management of multiple outside providers. As mentioned before, the efforts of several disparate groups were combined to develop the platform — an actuarial firm, an external IT firm, data vendors, reinsurers, and internal IT. Project coordination processes were developed to bring together all of these parties at the same time and place.

KEYS TO SUCCESS

The key to the success of this project were:

- **Effective executive sponsorship:** A consistent element in all successful change initiatives is sustained leadership support. The Freedom Specialty implementation is no exception. Managing multiple constituencies, communicating the vision, convincing experienced underwriters to give the new tool a chance to succeed, and protecting the project through the build stage and beyond were all critical. Interviews with individual team members repeatedly illustrated how the executive sponsor repeatedly supported different functions at critical times throughout the development stage. In projects that marry predictive analytics with technical underwriting, leaders must understand issues across a broad array of disciplines to a fair level of detail. The Freedom Specialty case is an example of superior leadership in problem solving, establishing consensus in multiple areas, and project execution.
- **Calculated risk-taking:** Given the business environment in 2008, it is meaningful that Scottsdale Insurance chose to invest in a novel, data analytics approach at that time. Undoubtedly, the portfolio balancing effect was an attractive feature of the proposition. However, although analytics is a common topic in insurance technology currently, using a predictive model to supplement underwriting selection was largely unknown in 2008. It should be noted that, at the time the decision was made, the predictive power of class action litigation was unproven. There is no doubt that the industry experience of the leadership was a key mitigation factor, but a basic key to success was the ability of Scottsdale to place a bet on a radically new approach.
- **Performance of vendors:** Several new statistical, technical, and delivery methods were combined to build the platform. According to the project team members, all of the vendors involved in the project, including the internal IT organization of the parent, demonstrated significant flexibility and commitment to develop novel solutions. For example, much of the platform runs on the SAS on Demand Service. As an early adopter of this technology in 2008, adjustments were necessary along the way to tune the environment for Freedom Specialty's needs.

NEXT STEPS

The success of the platform opens several options for Freedom Specialty. The specificity of the analysis yields a detailed assessment that can be used to engage brokers and policyholders in risk management discussions with this data. It is possible that a version of the risk engineering approach used in property lines of business can be extended to liability lines. This would result in a level of service that differentiates Freedom Specialty from its competitors.

Another expansion of the model involves applying a similar approach to other liability lines of business, such as surety.

Finally, the same techniques used in the back-testing and categorization processes can be applied to evaluate the predictive potential of other data elements. Having built these utilities and refined them for the current model positions Freedom Specialty to discover other powerful information sources.

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